**BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI**

**INSTRUMENTAL METHODS OF ANALYSIS: BIO F244**

**II SEMESTER: 2015-16**

**MID TERM EXAMINATION**

**Max Marks: 40 (10% Weightage) Date: 16/03/16**

**Time: 90 min**

Instructions: Please answer Part A & B separately in the same answer sheet.

**PART A**

Q 1. Arrange the following in decreasing order of wavelength:

Visible light, Microwave radiation, Infrared radiation, X Ray radiation, Gamma rays, Radio waves, UV rays. (2)

Q2. Which phenomena (Reflection, Refraction, Diffraction, Polarization, Radiation) is responsible for each of the observations given below :-.

1. Appearance of Rainbow
2. CD appearing to be multicolor
3. Return of water waves after hitting an obstacle
4. Beam passing through hole of approximately equal wavelength
5. Halo around moon
6. Echo of sound (3)

Q3. If you are to measure the absorbance of Cobalt chloride in an aqueous solution at a very low concentration what would be the problem and why? If the conc. is extremely high then what problems do you expect? Justify with reason. (3)

Q4. Compare the Cornu prism with Littrow prism. Also draw suitable labeled ray diagram of each. (3)

Q5. Draw a schematic diagram of single and double beam spectrometer. (3)

Q6. How can you use the various instruments studied by you till now in IMA Lab to characterize a given organic sample. For each instrument also mention the property of the compound studied using it. Give your answer in tabular form. (4)

Q7. Which of the instruments studied by you in IMA lab till now can be best used to analyze soil fertility. Justify your answer. (2)

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**PART B**

Q1. Differentiate between ‘sensitivity’ and ‘selectivity’ of a given instrument for analytical purposes. [3M]

Q2. Mention briefly how fluorescence can be used for qualitative and quantitative analysis of DNA. [3M]

Q3. With the help of a labeled energy diagram, represent the difference between fluorescence and phosphorescence. [3M]

Q4. Suppose a friend of yours is planning to set up a lab that will be routinely involved in isolation and analysis of natural products from plants, how would you advise him/her regarding the instruments he/she should purchase for the purpose? Mention briefly the logic behind suggesting each particular instrument. [5M]

Q5. Differentiate between conventional and high-performance TLC plates with respect to separation efficiency and sample capacity. Which out of the two kinds of TLC plates would you use for preparative TLC? Why? [4M]

Q6. Mention briefly why fluorescence emanating from a sample placed in the cuvette is measured at 90° angle to the incident radiation. [2M]

**GOOD LUCK**